APPENDIX H

TECHNICAL REPORT ON

BIOLOGICAL EVALUATION

BP CHERRY POINT REFINERY COGENERATION PROJECT

Prepared for:

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Submitted By:

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EXECUTIVE SUMMARY

BP West Coast Products, LLC (BP) is filing an Application for Site Certification (ASC) for submittal to the State of Washington Energy Facility Site Evaluation Council (EFSEC). The ASC will describe the environmental impacts of a proposed 720-MW Cogeneration plant that will be constructed on industrially zoned property owned by BP adjacent to the existing BP Cherry Point Refinery (Refinery).

The Cogeneration Project represents a relatively small addition to the existing Refinery, which has been in operation at this site for over thirty years. The existing Refinery fenceline will be modified and extended to include the new facility. The proposed facility's impacts to sight, sound, land use, and habitat are expected to be small and similar in character to those that exist in this industrial area today. For example, the existing level of background noise from the Refinery, Praxair, and Chemco, is very low and is similar to the "white noise" of a distant cooling fan. Wildlife that use the area today have adapted to the sights and sounds of existing operations and except for a small change in the developed area next to the Refinery, should experience little change in their habitat as a result of the Cogeneration Project.

BP, with the assistance of Golder Associates Inc., has prepared this Biological Evaluation (BE) to facilitate consultation under Section 7(c) of the Endangered Species Act (ESA). In June 2001 and again in November 2001, Golder requested a species list from the U.S. Fish and Wildlife Service (USFWS) and consulted the National Marine Fisheries Service's (NMFS) ESA World Wide Web site.

Based on the NMFS Internet site and the USFWS and Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) lists, the following listed and candidate species were identified as potentially found in the project area.

- Chinook salmon (*Onchorhynchus tshawytscha*) - Threatened
- Bull trout (*Salvelinus confluentus*) - Threatened
- Coho salmon (*Onchorhynchus kisutch*) - Candidate
- Humpback whale (*Megaptera novaeangliae*) - Endangered
- Leatherback sea turtle (*Dermochelys coriacea*) - Endangered
- Steller sea lion (*Eumetopias jubatus*) - Threatened
- Bald eagle (*Haliaeetus leucocephalous*) - Threatened
- Marbled murrelet (*Brachyramphus marmoratus*) - Threatened

The BE describes baseline environmental conditions in the project area and presents information on the habitat requirements of these listed and candidate species and their potential uses of the project area. In addition, the potential impacts to listed, candidate, and other important ecological species are described in detail in this BE.

The following determinations for the effects on listed and candidate species are recommended in this BE:

- Chinook salmon - Threatened - No effect

- Bull trout – Threatened - No effect
- Coho salmon – Candidate - No jeopardy and if listed no effect
- Humpback whale - Endangered - No effect
- Leatherback sea turtle - Endangered – No effect
- Steller sea lion - Threatened – No effect
- Bald eagle - Threatened - No effect
- Marbled murrelet - Threatened - No effect

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LIST OF ACRONYMS

ASC	Application for Site Certification
EFSEC	Energy Facility Site Evaluation Council
BE	Biological Evaluation
ESA	Endangered Species Act
USFWS	United States Fish and Wildlife Service
NMFS	National Marine Fisheries Service
PHS	Priority Habitat and Species
Corps	United States Army Corps of Engineers
MW	Megawatt
HRSG	Heat Recovery Steam Generator
ACC	Air-Cooled Condenser
BMP	Best Management Practice
SWPPP	Stormwater Pollution Prevention Program / Plan
SPL	Sound Pressure Level
dB	Decibel
GTG	Gas Turbine Generator
STG	Steam Turbine Generator
SCR	Selective Catalytic Reduction
NPDES	National Pollutant Discharge Elimination System
WWTP	Waste Water Treatment Plant
API	American Petroleum Institute
WDFW	Washington Department of Fish and Wildlife
WAC	Washington Administrative Code
TMDL	Total Maximum Daily Load
MLLW	Mean Lower Low Water
ESU	Evolutionarily Significant Unit
EFH	Essential Fish Habitat

1. INTRODUCTION

BP West Coast Products, LLC (BP), the owner and operator of the BP Cherry Point Refinery, proposes to construct and operate a cogeneration facility (Cogeneration Project) adjacent to its Refinery near Blaine, Washington.

BP must obtain several permits to authorize construction and operation of the proposed Cogeneration Project, including a Clean Water Act Section 404 permit from the Corps authorizing the discharge of fill material in wetlands. Section 7 of the Endangered Species Act (ESA) requires the Corps to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) prior to issuing the 404 permit. This biological evaluation (BE) has been prepared by BP to facilitate the consultation.

The Cogeneration Project represents a relatively small addition to the existing Refinery, which has been in operation at this site for over thirty years. The existing Refinery fenceline will be modified and extended to include the new facility. The proposed facility's impacts to sight, sound, land use, and habitat are expected to be small and similar in character to those that exist in this industrial area today. For example, the existing level of background noise from the Refinery, Praxair, and Chemco, is very low and is similar to the "white noise" of a distant cooling fan. The wildlife that use the area today have adapted to the sights and sounds of existing operations and except for a small change in the developed area next to the Refinery, should experience little change in their habitat as a result of the Cogeneration Project.
This BE has been prepared following Corps (Gossett 2001) guidelines and describes the following.

- The project and the specific area that may be affected by the action.
- Listed and candidate species within the project area, their level of use of the area, and any designated or proposed critical habitats within the project area.
- The potential impacts of construction and project operation on listed species.
- Conservation measures for endangered and threatened species and critical habitats.
- Impacts to Essential Fish Habitat.

2. PROJECT DESCRIPTION

2.1 Location

The Cogeneration project site is in Whatcom County, Washington, near the cities of Ferndale and Blaine (Figures 1 and 2). The location coordinates for the proposed power plant are as follows:

- T39N, R1E, Section 8
- Latitude 48°53.252' N, longitude 122°43.266' W

The Cogeneration project is located wholly within Washington State Water Resources Inventory Area 01, Strait of Georgia Independent Drainages (Williams et al. 1975).

2.2 Facility Description, Purpose, and Need

The proposed Cogeneration Project site is located in Whatcom County, Washington, within the Cherry Point area that is zoned for "Heavy Impact Industrial" development. The project site is approximately 7 miles south of Blaine, WA and 6 miles northwest of Ferndale, WA.

The facility will be a 720-megawatt (MW) natural gas-fired combined-cycle combustion turbine cogeneration plant adjacent to the BP Cherry Point Refinery. The Cogeneration plant would be configured with three combustion turbines. Each of the gas turbine trains would be equipped with a heat recovery steam generator (HRSG) with duct firing capability to augment steam production. Steam would be produced at high pressure in the HRSG's and sent to one steam turbine-driven electric generator, with extraction and condensing capability. The Refinery would serve as a "steam host" for a portion of the steam produced by the HRSGs. The power generated, net of Refinery consumption, would be exported via a new transmission line connected to the existing 230-kV BPA transmission line located adjacent to BP property.

The Cogeneration Project will integrate operations with the Refinery to increase efficiency and reduce the consumption of and impacts to natural resources. Figures 3A and B illustrate this integration. The Cogeneration plant will supply steam and electricity to the Refinery, which will in turn recycle hot condensate and return boiler feed water back to the Cogeneration Project. The Cogeneration Project will allow the Refinery to shut down older, less efficient boilers that are currently used for steam generation and make other modifications to reduce emissions. These actions will reduce criteria pollutant and CO2 emissions, resulting in a net reduction of criteria pollutant emissions from Cherry Point.

The proposed Cogeneration plant will be fueled by natural gas and will not use backup fuels. The Cogeneration plant will minimize water consumption by using an air-cooled condenser (ACC) instead of water-intensive evaporative cooling systems. A portion of wastewater produced by the Cogeneration facility will be sent to the Refinery for

recycling, further reducing the amount of fresh water needed by the Project, and the remainder will be sent to the Refinery wastewater system for treatment..

2.3 Construction

The Cogeneration site is located on unimproved land owned by BP, adjacent to the Refinery, that is zoned Heavy Impact Industrial. The Cogeneration plant site is relatively flat (approximately 1 percent grade) and contains grasses, shrubs, and small trees (see Section 3.3, Baseline Conditions for more detail).

Initial activities upon mobilization will be a site survey and establishment of the field construction office, site parking, and laydown areas. Wetlands adjacent to the project site will be fenced off for protection.

The Cogeneration plant site will be cleared and graded. The slope will be designed to induce stormwater drainage during construction by sheet flow into a perimeter trench system for collection and disposal (see Section 2.7, Stormwater Treatment and Discharge). Conventional construction equipment, including bulldozers, front-end loaders, trucks, tractor scrapers, and graders will be used for site preparation. To the extent possible, excavated material of acceptable quality will be retained on the site for reuse as backfill. It will be stockpiled in designated locations using proper erosion protection methods. Excess material to be removed from the site will be disposed of at an acceptable designated location.

After the initial cut and fill, a rough grading of the plant site will be performed. The access roads to the plant site from Grandview, Brown, and Blaine roads will be prepared and rough graded. Graded areas will be compacted, free from irregular surface changes, and sloped to drain. Temporary roads, plant perimeter roads, laydown and parking areas, and other work areas will be constructed with a gravel surface. The source of this gravel aggregate and sand material will be determined by the contractor but is expected to be from local permitted sources.

Areas to be backfilled will be prepared by removing unsuitable material and rocks. The bottoms of excavations will be examined for loose or soft areas. Such areas will be excavated fully, backfilled with suitable material, and compacted. Cut and fill slopes for permanent embankments will be designed for Seismic Zone 3, with retaining walls used as required. Backfilling will be performed in a controlled manner in layers of uniform specified thickness to achieve the desired density. The contractor will supply fill materials from permitted local sources.

After site preparation and rough grading are complete, the contractor will install the piling and concrete foundations required for the support of the combustion and steam turbine generators, HRSGs, stacks, pipe supports, electrical equipment, and other miscellaneous equipment items, tanks, and support facilities. Pile-supported concrete foundations will be used to provide support for all major equipment items, major building columns, and pipe racks. Construction of these foundations will require the use of heavy equipment, including pile-driving equipment, excavation and backfill

equipment, concrete-pumping equipment, and concrete-finishing equipment. In addition, light and medium duty trucks, air compressors, generators, and other internal combustion engine-driven equipment will be used.

The Cogeneration plant construction will commence with installation of underground systems, which include piping, sewers, duct banks, and grounding grid. After the installation of the underground systems and foundations, the excavated areas will be backfilled, compacted, leveled, and gravel-finished for installation of the aboveground portion of the facility.

At the completion of construction, the final grading of the surfaces will be performed. The roads, parking lot, and other designated areas in the power block, maintenance, and warehouse areas will be paved, while the balance of the plant area will be finished with a gravel surface. Gravel surfacing will also be provided at the switchyard. All side slopes and embankments will be protected against erosion with landscaping or seeded with grasses common to the local area. Vegetation and trees will be planted between Grandview Road and the project site, and in the northern portion of Laydown area 2 to provide a visual buffer of the project from Grandview Road.

2.3.1 Construction Best Management Practices

The construction contractor may alter the construction sequence and the equipment used in the course of managing the project. However, Best Management Practices (BMPs) will be followed regardless of the sequence of events. BMPs for construction work on-site are described in the following paragraphs.

The contractor will provide a Stormwater Pollution Prevention Plan (SWPPP), which will be developed prior to site preparation activities, and will use the erosion control measures in the plan (see Section 2.7, Stormwater Treatment and Discharge). Erosion control measures may include such items as silt fences, straw bales, rock bases, temporary water conveyance structures, and detention ponds. The plans will be coordinated as applicable with the existing Refinery programs.

During construction, dust will be controlled as needed by spraying water on dry, exposed soil. Work areas will be organized and cleaned as necessary.

The proposed site is fairly flat with an undulating, hummocky surface. Water that does not infiltrate directly into the ground would normally run off toward the north and west. During construction, silt fences, gravel bags, drainage swales, and ditches will be used to control the flow from the work area to prevent adverse sedimentation or erosion to the undisturbed areas adjoining the site. Runoff will be collected into a perimeter ditch, which will feed a main collection ditch for the Cogeneration facility. Sediment from incidental erosion will be collected by conventional means within the perimeter ditch. The site runoff will be diverted to oil/water separators and detention ponds where the silts and fines will be allowed to settle out.

Upland surface water runoff will be diverted around the construction areas by means of swales and ditches and returned to the general area to which they originally drained. Erosion control measures will be installed at all outfall locations to minimize any adverse effects to the undisturbed surrounding terrain. Vegetation will be planted on all permanently exposed sloped areas and ditches to minimize any erosion to these surfaces.

Stormwater from equipment laydown areas will be routed first to an oil/water separator to ensure no oil is carried off the construction site, and then allowed to flow to a detention pond to settle suspended solids. Clarified water from the detention pond will be routed to feed existing wetlands and duck ponds north of Grandview Road.

As the site is cut and filled to its final elevation, the main portions of the permanent plant stormwater system will be installed and incorporated into the temporary construction stormwater system. The permanent plant system will consist of catch basins, manholes, and an underground stormwater piping system that will discharge to an oil/water separator before discharging to a detention pond. Water from the detention pond will be routed to feed a constructed wetland north of Grandview.

2.3.2 Construction Schedule, Sequence, and Activity Time Requirements.

Construction of the Cogeneration Project would take approximately 23 months. Details of a typical construction schedule for a Cogeneration Project are presented in Figure 4.

2.4 Operations

2.4.1 Air Emissions

The proposed Cogeneration Project will enable BP to shut down existing boilers and make other modifications to reduce criteria pollutant emissions at the Refinery. The result will be a net reduction in these emissions from the Cherry Point site of 74 tons/year. Details of these emission offsets are provided in Table 2.3-3. The remainder of this section discusses air emissions from the proposed Cogeneration Project without reference to offsetting emission reductions at the Refinery.

The Project will result in the emission of criteria pollutants such as particulate matter (PM_{10}), oxides of nitrogen (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), volatile organic compounds (VOCs), some toxic air pollutants (TAPs) and a variety of other air emissions from the combustion of natural gas. Combusting only natural gas in the combustion turbines and duct burners will minimize emissions associated with proposed operations.

Each of the combustion turbines will be equipped with lean pre-mix dry low-NO_X combustors. These combustors have been developed to minimize the formation of NO_X. Selective Catalytic Reduction (SCR) catalyst beds and ammonia injection grids for the control of NO_X emissions will be installed in each of the HRSGs as well as catalytic

oxidation beds for the control of CO emissions. The CO oxidation catalyst will also control some of the VOC emissions. The use of natural gas as fuel, good combustion controls, and good operating practices will minimize emissions. Sulfur dioxide will be controlled through the use of natural gas, which is inherently low in sulfur.

Air quality impact studies were performed for the Project to evaluate projected ground-level pollutant concentrations, the potential effect on the public health and welfare, the effect that the emissions would have on soils and vegetation, odors, and the potential effects associated visibility at National Park Service and U.S. Forest Service designated sensitive areas.

2.4.2 Sound Emissions

Because the operation of the Cogeneration Project will result in sound emissions, Golder Associates Inc. performed a comprehensive noise study. The character of the sound generated by the proposed project should be substantially similar to the existing background sounds generated by the Refinery. The purpose of this study was to assess the existing (background) ambient noise levels in the project area and then to compare this to the predicted sound levels from the Cogeneration Project to determine potential effect of the Cogeneration Project in full operation. The study measured the background noise levels at 15 receptor locationsto the north, east, and west, of the project site. The background noise data, along with the anticipated noise by the Cogeneration plant's turbines during operations, were used to determine the total noise impact of the Cogeneration facility. These impacts were calculated using a computer-based sound propagation model (Golder , July 2001) that was developed to assist with noise propagation calculations.

2.4.3 Industrial Wastewater Treatment and Discharge

The wastewater from the Cogeneration plant that will be discharged with the Refinery's wastewater will have the estimated initial physical and chemical characteristics listed in Table 3. It should be noted that only industrial process wastewater characteristics are discussed here and listed in Tables 3 and 4. About 40 gpm of boiler blowdown will be recycled for use by the Refinery, and so is not included in this description. Stormwater runoff from the project site will be described in the following section. Sanitary wastewater will be routed to the Birch Bay Water and Sewer District (District) wastewater treatment plant for treatment and discharge.

The Cogeneration wastewater that will be discharged through the Refinery NPDES discharge point. It will originate as three streams:

- Demineralization plant regeneration water (influent pretreatment wastewater),
- Oily wastewater, which is water from storage tank secondary containment area drains and equipment area drains which has the potential to carry oil with it.

Net process wastewater from the Cogeneration Project to the Refinery wastewater treatment plant will be 50 gpm . An analysis of the proposed wastewater that would be produced by the Cogeneration facility shows that the Refinery wastewater treatment system has the capacity to treat the facility's wastewater with negligible or even slightly beneficial impacts due to additional dilution.

Industrial process wastewater will be routed to the Refinery for treatment and discharged through the NPDES-permitted outfall (number 001). Table 4 presents a numerical analysis of the potential impact of the Project wastewater on the Refinery's wastewater stream. Cogeneration plant wastewater would be co-mingled at the head of the Refinery wastewater stream and treated with the wastewater in the Refinery treatment system. The impact analysis is based on the average discharge from the Refinery over the months of July, August, and September 2001.

This wastewater would be treated in the Refinery wastewater treatment plant (WWTP) as described in the following paragraphs. In the WWTP, wastewater receives both mechanical and biological treatment to eliminate impurities. It is initially treated to adjust to a pH of 7 to 8, and is then routed to American Petroleum Institute (API) separators, where decreased velocity allows any oil to float and solids to settle. Oil is skimmed off and recovered for reprocessing and solid material (sludge) is collected and recycled.

Water from the API separators is pumped to an equalization surge tank, which is also an aeration basin. The surge tank meters the flow rate, creating a more constant flow to the aeration basin where biological treatment takes place. During this processing phase, microorganisms consume trace hydrocarbons that remain in the water after mechanical separation has taken place. Six fixed and two floating surface aerators are used to force additional oxygen into the solution, and steam spargers control temperature to provide an environment for the bacteria that is amenable to maximum consumption of contaminants.

Aeration basin effluent is a mixture of water and bacteria that flows to the clarifier for separation. Bacteria settle out and form a biological sludge, which is returned to the aeration basin or pumped to a de-watering unit as a waste product. The clarified water flows to two clarification ponds that are arranged in series and provide residence time to permit additional settling of suspended material. The water leaving the second clarification pond flows into an outlet pipe and a gravity aerator prior to entering the final holding pond.

The final holding pond provides another opportunity for the settling of solids. After traveling the length of the pond, the final effluent is pumped to the Strait of Georgia where it is discharged offshore through an effluent diffuser located at the end of the Refinery's pier at Cherry Point. Continuous sampling and testing of the final effluent verifies that it meets all requirements established by the Washington State Department of Ecology (Ecology) before it is discharged to the Strait.

2.4.4 Stormwater

Regulatory requirements for stormwater treatment and discharge were presented in a report prepared by Golder. (Golder, October 2001). It should be noted that two project-specific Stormwater Pollution Prevention Plans (SWPPP) will be required, one for the construction phase and one for operation. The SWPPP for construction will primarily include the detailed design of the surface water control system, together with erosion and sediment control plans, described in Section 2.3. The SWPPP for operations will describe operational and source BMPs, spill control plans, emergency response procedures, and similar information.

The areas of the BP Cherry Point Refinery property where the existing surface water flow will be modified by construction include the Cogeneration plant site and the laydown, parking, and other support areas. The project area was subdivided into 6 drainage areas, as shown on Figure 6.

The drainage areas were divided into two categories. The first is diverted runoff, where stormwater is routed around the plant site and support areas and which is not affected by the project. The second category is runoff collected from the plant site and support areas. This collected runoff will be routed through an oil / water separator and detention pond (Golder, October 2001) prior to discharge. The two types of areas are identified on Figure 6.

The proposed storm water system maintains the present condition of the drainage basin where all runoff is within the Terrell Creek basin. Runoff presently flowing through the ditch on the south side of Grandview Road and into Terrell Creek, would be diverted north of Grandview Road into a detention basin to settle suspended solids before flowing into a wetland mitigation area. The water would then follow natural drainage patterns eventually flowing into Terrell Creek. Additional runoff would remain within the existing drainage system south of Grandview Road.

Peak stormwater flows were calculated and the results of this analysis are shown in Table 5.

Stormwater from undisturbed areas (Drainage Areas 1, 2, and 3 on Figure 6) would be routed under Grandview Road, and will flow into an existing ditch at the location shown on Figure 6. Because the discharge rate from these drainage areas would not be affected by the project, flow control is not considered necessary, and no detention pond is proposed.

Runoff from the plant site and support areas would require both quality and quantity (flow) control (Golder, October 2001). An oil / water separator and detention pond would maintain quality requirements and are proposed at two locations shown on Figure 6. Detention Pond 1 would be located north of Grandview Road and would provide clean stormwater to the surrounding wetlands. Detention Pond 2 would discharge into the existing drainage immediately west of the project, as shown on Figure

6. Both detention ponds were sized using predicted post-development runoff values as provided in stormwater management guidelines by Ecology.

The detention ponds were sized to provide both static storage volume to allow settling of suspended solids, and dynamic storage to limit the peak discharge to pre-development values. The deepest 3 to 4 feet of the ponds provide the static storage volume, while the upper 2 to 3 feet provide flow-control storage. The discharge rate is controlled by the diameter of the outlet pipe.

Oil / water separators are proposed upstream of each detention pond inlet to ensure no trace oil would be carried by surface water off of the project site. These separators would be small vaults with valves at the outlet to stop flow to the ponds and isolate the water to facilitate cleaning.

3. DESCRIPTION OF THE STUDY AREA

3.1 Action Area

The "action area" is defined by the 33-acre plant site and 36-acre construction laydown area, which would receive direct impacts from the construction and operation of the proposed Cogeneration Project. The plant site is located immediately adjacent to the existing Refinery. The construction laydown area is inside the Refinery fenceline.

Direct effects under ESA are defined as "effects that may result from the project that would directly affect a species." The "potential direct effects" areas for this study are defined by the particular type of potential effect being considered. For instance, the "potential direct effects" area for noise is very small, while the potential direct effects area for air emissions may be larger.

Indirect effects under ESA are defined as "effects that may result from the project that would occur at a later time." Marine waters is an example of a "potential indirect effects" area

It is unlikely that combined wastewater from the Refinery and the Cogeneration Plant (see Section 2.7) would impact marine receiving waters. The overall increase in wastewater loading from the Cogeneration Project is approximately 50 gpm and this is less than the current daily average wastewater flow fluctuation at the NPDES outfall.

Discharges of stormwater would also eventually enter the main stem of Terrell Creek and downstream portions of the stream to Birch Bay, but they too would be unlikely to impact marine waters, since the stormwater system is designed to maintain existing stormwater runoff conditions within the Terrell Creek basin. Thus, the marine waters receiving the Refinery's industrial discharge to the extent of the NPDES chronic dilution zone and Terrell Creek to its mouth are referred to as an "potential indirect effects" area.

3.2 Existing Developments

Within the study areas, the largest existing development is the BP Cherry Point Refinery, which has been operating continuously since 1971. Additional existing developments near the study action area as defined above include the following:

- Puget Sound Energy's Point Whitehorn Generating Plant,
- PRAXAIR's CO_2 liquefaction plant,
- Chemco's wood treating plant,
- Several rural single-family residences
- Cattle ranching, and
- Dairy farm.

3.3 Baseline Conditions

3.3.1 Terrestrial and Wetlands

The proposed Cogeneration Project site was used for agricultural purposes for many decades, but for at least thirty years has been owned by BP and is zoned Heavy Impact Industrial. Several man-made drainage ditches traverse the property. These ditches were likely used when the land was farmed to remove excess water from the soils in winter and spring by increasing runoff rates from adjacent wetlands. These ditches are probably not functioning as originally intended because they have not been maintained and are partially vegetated. Vegetation in the ditches may inhibit surface water flow and decrease the removal of water from wetlands.

Two types of wetlands were found within the project site, emergent herbaceous and a palustrine emergent. A detailed of the wetland areas may be found in Appendix H, Wetland Delineation.

Additional wetland and riparian habitat areas were identified in and along Terrell Creek, which flows roughly a half mile to the east and to the north of the proposed Cogeneration Project site. BP has, through the advice and guidance of the WDFW and local conservation groups, engaged in restoring and enhancing wetlands and riparian habitat along Terrell Creek.

The wetlands in the area were assessed using the *Methods for Assessing Wetland Functions. Vol. 1: Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology, 1999b). This assessment is presented in the *Wetland Functions and Values Assessment Technical Memorandum for BP Cherry Point Cogeneration Project* (Golder, September 2001). As shown in the assessment, the wetlands function on a very low level for wetland dependent species (e.g., birds, invertebrates, and amphibians). The wetlands rated negligibly, if at all, for resident and anadromous fish habitat as there is no open water and the drainage ditches only serve as a hydrologic connection to Terrell Creek in times of high rain flow.

The wetlands function at low levels for groundwater recharge, nutrient and toxicant removal, and downstream erosion and peak flow attenuation. This is likely due to the slow permeability of the soils and the relatively undisturbed nature of land use upgradient of the wetlands. The wetlands do function as producers and exporters of primary production due to the drainage outflow afforded by the ditches, but this function is likely at a low level because the ditches have not been maintained.

3.3.2 Streams

Terrell Creek is an 8.7-mile-long, third order stream that discharges to Birch Bay. Terrell Creek was evaluated by BP (URS Corporation, 2001) for the purposes of impact evaluation and mitigation potential on June 20-21, 2001, and June 27-28, 2001.

The creek channel dimensions, riparian vegetation, and in-stream conditions change significantly across this length. From the railroad tracks to approximately mid-way between Blaine Road and Jackson Road, the stream has a 0.5 to 2 percent gradient, a cobble and gravel substrate, and deep shading by mature riparian forest. Channel width ranges from 3 to 8 feet. The floodplain is narrow (2 to 10 feet from the bank) in most locations, but appeared to contain some wetland areas. Water was flowing at 0.2 to1.5 feet per second (fps) and was 2 to 7 inches deep at the time of the URS survey. An estimated discharge rate was approximately 1.5 cubic feet per second (cfs). This portion of the stream has excellent water clarity and flows over a coarse substrate suitable for aquatic flora and fauna adapted to lotic conditions.

The side-slopes that contain the riparian zone of the upper section range in grade from 10 to 80 percent, but are typically 15 to 50 percent. The banks are 20 to 50 feet higher than the surface of the stream and are typically 90 to 140 feet in length. Some bank undercutting is present, but banks appear stable.

The lower section from mid-way between Blaine Road and Jackson Road to the west edge of the survey area (south of Birch Bay State Park) has a 0 to 0.5 percent gradient, a silt substrate, and little shading from adjacent vegetation. Channel width in this section ranges between 3 and 15 feet. The floodplain is very broad (120 to >200 feet) in most locations and is entirely composed of wetland that is seasonally flooded, but saturated during most times when it is not flooded (URS Corporation, 2001). Water was flowing at 0 to 0.1 fps and was approximately 2 to 6 feet deep at the time of the URS survey. Since the water was flowing so slowly, no discharge rate could be estimated. Water clarity was low to moderate; turbidity permitted visibility to only a few inches depth below the water surface. No fish were observed in this portion of the creek. This portion of the stream flows over a fine substrate suitable for aquatic flora and fauna adapted to lentic (slow water) conditions. The riparian side-slopes of the lower section are typically 15 to 50 percent grade and 10 to 15 feet above the water surface. No bank undercutting or indications of bank instability were observed.

According to WDFW, anadromous and resident fish species occurring in Terrell Creek include coho salmon (*Oncorhynchus kisutch*), searun cutthroat (*Oncorhynchus clarki*), resident cutthroat (*Oncorhynchus clarki*), and winter steelhead (*Oncorhynchus mykiss*). However, WDFW regional habitat biologists (Warinner, 2002; Huddle, 2002) have found only coho and cutthroat juveniles in the stream. Adult spawning activities have not been observed. In addition, numerous spiny ray fish (e.g., large-mouth bass) have been found in smolt traps and have also been observed during surveys.

Huddle (2002) indicated that “incidental use by native char” such as bull trout (*Salvelinus confluentus*) or Dolly Varden trout (*Salvelinus malma*) is possible due to straying by fish returning to the Nooksack or Fraser rivers. However, this use would be limited to feeding since Terrell Creek does not offer suitable habitat for spawning by these trout.

State Water Quality Classifications are found in Chapter 173-201a of the Washington Administrative Code (WAC). There are no specific classifications for Terrell Creek. Thus, Terrell Creek falls under WAC Chapter 173-201A-120, general classifications, and is classified as Class A, excellent waters.

Neither Terrell Creek nor Terrell Lake is included on Ecology's section 303(d) list of impaired waters. There are no total maximum daily load (TMDL) plans or other water quality limitations established for these waters.

3.3.3 Marine Waters

The marine waters receiving the treated wastewater from the BP Cherry Point Refinery, would also receive the combined treated wastewater from the proposed Cogeneration Project. The marine waters were recently described in an ESA BE (Berger / ABAM, 2000). The following description of marine baseline conditions is taken from that BE.

Where suitable substrate is present (e.g., rocks for macroalgae attachment), submerged marine vegetation extends from the middle intertidal zone down to about 30 feet below mean lower low water (MLLW). Eelgrass (*Zostera marina*) is present on both sides of and under the BP Refinery pier but extends to only approximately 6 feet below MLLW due to chronic natural turbidity and mobile sediments. Thus, the seafloor within the NPDES chronic dilution zone does not support submerged marine vegetation, as this area is approximately 35 to 90 feet below MLLW. However, kelp (*Nereocystis luetkeana*) and other macroalgae have been reported attached to the piling supporting the Refinery pier within the chronic dilution zone.

Nearshore habitats and characteristic species near the wastewater discharge are typical of those found along the Cherry Point shoreline. The seafloor habitat within the industrial wastewater chronic dilution zone is silty gravelly sand sediment with relatively strong tidal currents (1 or more knots during maximum ebbs and floods). This habitat is characterized by a sparse epifauna.

The Cherry Point shoreline and the area around the BP Refinery industrial wastewater discharge support a variety of finfish, the most notable of which is the Pacific herring (*Clupea pallasi*). In addition to Pacific herring, surf smelt (*Hypomesus pretiosus*) use beaches north and south of Cherry Point, which is outside the Cogeneration project action area, for spawning from June through August.

A variety of salmonids are known to occur along the Cherry Point shoreline and in the vicinity of the BP Refinery pier. Large numbers of pink (*Onchorhynchus gorbuscha*), chum (*O. keta*), coho (*O. kisutch*), and chinook (*O. tshawytscha*) salmon have been found in the cobble habitats of the Cherry Point shoreline and in the protected eelgrass beds of Birch Bay. Juvenile sockeye salmon (*Onchorhynchus nerka*) were also found in Birch Bay, but were generally less abundant than other species.

Adult chinook, pink, coho, and chum salmon migrating to the Fraser and Nooksack rivers, Terrell Creek (coho only), and natal streams in Drayton Harbor can be expected to transit and feed along the Cherry Point shoreline.

Steelhead (*Onchorhynchus gairdneri*) were not noted in any samples for the Cherry Point vicinity, nor were sea-run cutthroat (*Onchorhynchus clarki*) or other trout species. However, sea-run cutthroat stocks have been identified in several tributaries to the southeast Strait of Georgia. Because sea-run cutthroat are nearshore residents throughout much of their marine life and do not migrate extensively, they may be present in the Cherry Point vicinity year round.

A variety of flatfish are found in the Cherry Point area. Trawl data and scuba observations from the vicinity of the BP pier indicate that the flatfish populations in the potential indirect effects area consist mostly of juvenile fish.

The Cherry Point shoreline also supports a variety of marine birds and mammals. In addition, bald eagles (*Haliaeetus leucocephalus*) use the marine habitats along the Cherry Point shoreline for feeding.

A variety of marine mammals use the southeast Strait of Georgia. Mammals sometimes found along the Cherry Point shoreline include the following species:

- Harbor seal *Phoca vitulina*
- Pacific harbor porpoise *Phocoena phocoena*
- California sea lion *Zalophus californianus*
- Gray whale *Eschrichtius robustus*

Harbor seals use the rocky beaches for hauling out and pupping near Point Whitehorn. There are no known breeding or haulout sites for sea lions in the Cherry Point vicinity. The Cherry Point shoreline is generally unsuitable for sea lion haulout or use by whales because of the large areas of shallow water near shore.

4. LISTED AND CANDIDATE SPECIES

In June and November 2001, Golder Associates Inc. requested lists of federally protected species within the project area from USFWS. In addition, internet pages maintained by the USFWS and NMFS were studied to develop the list of threatened and endangered species. The following federally listed and candidate species that are known to or could occur within the project area was compiled from these sources for the preparation of this BE:

- Chinook salmon (*Onchorhynchus tshawytscha*) – Threatened
- Coho salmon (*Onchorhynchus kisutch*) - Candidate
- Bull trout (*Salvelinus confluentus*) – Threatened
- Humpback whale (*Megaptera novaeangliae*) – Endangered
- Leatherback sea turtle (*Dermochelys coriacea*) – Endangered
- Steller sea lion (*Eumetopias jubatus*) – Threatened
- Bald eagle (*Haliaeetus leucocephalous*) – Threatened
- Marbled murrelet (*Brachyramphus marmoratus*) – Threatened

In addition to listed species, organisms identified as "candidates" are addressed in this BE. Candidate species are those that are currently under review for listing, but have no legal protection under the ESA.

4.1 Description of Species Status and Habitat

4.1.1 Chinook Salmon — Puget Sound Evolutionarily Significant Unit (ESU): Threatened

Chinook salmon may occur in the marine portions of the indirect effects area as adults and juveniles. The nearest stream used by chinook salmon for spawning is the Nooksack River (Berger / ABAM, 2000, Williams et al., 1975) approximately 21 miles from the project site. Adult chinook salmon use offshore waters for feeding or during migration. Adult fish could be found around the mouth of Terrell Creek and Cherry Point from March through October, including both runs (Myers et al., 1998, Williams et al., 1975). Use of Terrell Creek by chinook salmon adults or juveniles has not been observed by WDFW (Huddle, 2002).

Juveniles of ocean or stream chinook salmon would be expected to use nearshore marine habitats off Cherry Point for feeding and refuge during migrations (Phillips, 1984). These juveniles would be expected to use the Cherry Point nearshore habitats from March through August (Williams et al., 1975, Thom et al., 1989).

4.1.2 Coho Salmon — Puget Sound/Strait of Georgia ESU: Candidate

Coho salmon may use Terrell Creek for spawning (Williams et al., 1975). However, no actual spawning has been observed (Huddle, 2002). If spawning occurred, adult fish would be expected in Terrell Creek in November through January. Juvenile coho salmon would be expected in the nearshore waters off Cherry Point in March through July (Weitkamp et al., 1995).

4.1.3 Bull Trout: Threatened

Bull trout in Puget Sound streams exhibit four life strategies: anadromous, adfluvial (using lakes and streams), fluvial (moving between or among different stream systems), and resident (staying in one drainage for their entire life span). While there are no known populations of bull trout within the project action areas, it is possible that adult bull trout from the Nooksack River or Fraser River could occur in the marine waters off Cherry Point. These adults could use nearshore waters and habitats for feeding (Berger / ABAM, 2000). Adults or juveniles could conceivably use Terrell Creek for feeding (Huddle, 2002). However, Terrell Creek does not offer suitable spawning habitat for bull trout (Huddle, 2002).

4.1.4 Steller Sea Lion: Threatened

Steller sea lions use all of Washington's marine and estuarine waters for feeding and resting. Their typical habitat is rocky or mixed beaches in isolated areas that are used for haulouts and feeding (Everitt et al., 1980, Gardner, 1981). The nearest known haulout area used by Steller sea lions is on Sucia Island, approximately 9 miles southwest of the BP Marine Terminal (Berger / ABAM, 2000). The only other regular haulout site in the inland waters of the Puget Sound region known to be used by Steller sea lions is on Race Rocks in the Strait of Juan de Fuca. It is possible that sea lions may use offshore waters of Cherry Point for occasional feeding. They would be most likely to be present in the early fall to early spring.

4.1.5 Humpback Whale: Endangered

Humpback whale sightings are a common occurrence along the Washington outer coast, with occasional sightings in the Strait of Juan de Fuca (Everitt et al., 1980). There have been only two or three sightings in Washington inland waters in the last 10 years (Berger / ABAM, 2000).

4.1.6 Leatherback Sea Turtle: Endangered

Leatherback sea turtles have a global distribution and have been recorded as far north along the eastern Pacific coast as Alaska (Mager, 1985, as cited in Cooke et al., 2000; Berger / ABAM, 2000). Sea turtles nest in tropical regions and only occasionally forage into more northern and colder waters. Sightings in Washington waters have been rare with only one or two unconfirmed sightings off the outer coast of Washington in the last

10 years. It is highly unlikely that this species would occur off Cherry Point because of the rarity of sightings in Washington waters and those sightings have been off the outer coast of Washington.

4.1.7 Bald Eagle: Threatened

Bald eagles primarily eat fish and sometimes feed on waterfowl and carrion (Watson and Pierce, 1998). Generally, 78 percent of an eagle's diet consists of fish, 19 percent of other birds, and 3 percent of mammals. As primarily fish-eaters, the birds usually nest within 1.6 miles of open water. Their home range in Washington averages 2.6 square miles (Watson and Pierce, 1998). Because of their reliance on fish, it is likely that eagles use the Cherry Point shoreline for foraging.

The WDFW PHS database identified several bald eagle breeding sites within 2 miles of the project site (WDFW PHS, 2000). The closest nest is located approximately 1.2 miles northwest of the proposed Cogeneration Project site near Meridian Road and Birch Bay (Figure 1). Another nest is located approximately 2 miles southeast of the study area along the shores of Lake Terrell (WDFW PHS, 2000). In addition, eagles use the beaches and bluffs to the south for foraging.

No bald eagles were observed on the proposed project site or within the immediate vicinity during approximately 12 days of wetland surveys by Golder Associates. The proposed project site is located within an area zoned Heavy Impact Industrial (Whatcom County Code, 2001) and is adjacent to the BP Cherry Point Refinery.
There are also no mature trees within the proposed plant site or construction staging areas. There are no snags or perches, no permanent open water, and no fish-bearing streams as the drainage ditches are seasonal and do not support resident fish populations. Thus, bald eagles likely do not use the direct effects action area for roosting or foraging.

4.1.8 Marbled Murrelet: Threatened

Marbled murrelets occur along the North Pacific coast from the Aleutian Islands and southern Alaska to Central California (USFWS, 1997). In the Pacific Northwest, murrelets live near shore, feeding on fish and invertebrates and nesting in stands of mature and old growth forest. Puget Sound waters are heavily used by murrelets during the summer breeding season to obtain food (USFWS, 1997). Preferred prey appears to be forage fish, especially Pacific herring and sandlance (*Ammodytes hexapterus*). Critical habitat for the marbled murrelet includes areas within a half-mile of mature or old growth trees that are, or could be, used as nesting sites. This habitat does not occur in the suburban and rural environment in the general vicinity of the Ferndale, Blaine or the Refinery.

ENSR (1995) conducted a study on the use of the BP marine terminal vicinity by marbled murrelets and other marine birds in 1995. During this study, nine murrelets or fewer (because of possible resightings of resident individuals) were observed. These birds

were seen using the “deepwater zone” defined by ENSR as that portion of the study area 1,300 to 2,300 feet from shore near the site of the Refinery pier. These birds were seen from late July through late September. Prior to this study, surveys conducted in 1993 found no murrelets in the area (ENSR, 1995).

5. ANALYSIS OF EFFECTS

Introduction

The analysis indicates there would be “no effect” from direct and indirect impacts on threatened or endangered species as a result of the construction and operation of the Cogeneration Plant. The types of effects that could result from construction and operation of the facility are described below and the recommended “effects” determination are ESA species in the action area are provided in Section 7.

The effects analysis describes potential direct and indirect effects of the action on the protected species and critical habitat within the action area. Direct and indirect effects have distinctive meanings under ESA and are not the same definitions as under the National Environmental Policy Act (NEPA). Direct effects under ESA are defined as “effects that may result from the project that would directly affect a species.” Indirect effects are defined as “effects that may result from the project that would occur at a later time."

5.1 Potential Direct Effects

The following potential direct effects from the construction and operation of the proposed Cogeneration Project are considered in this report.

- Accidental spills of petroleum products could occur in conjunction with machinery operation during construction.
- The physical process of site clearing and other construction activities would impact wetlands and other habitats on the proposed site.
- Air emissions from the proposed Cogeneration facility could affect habitats, vegetation, and listed species.
- Noise from construction and operation could disrupt the foraging activities of birds and mammals.
- Wastewater discharges could directly affect receiving wetland, stream, and marine habitats.

5.1.1 Accidental Spills

The Clean Water Act, 33 U.S.C. 1251, et seq., together with 40 CFR 112 establishes procedures, methods, spill response plans, equipment, and other requirements for equipment, to prevent the discharge of oil and other petroleum products from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines. The Cogeneration Project will be incorporated into the existing Refinery spill plan.

Risk of Spills During Construction

Diesel fuel, gasoline, motor oil, hydraulic fluid, brake fluid, and anti-freeze are used by construction machinery during construction. The contractor's responsibility will include implementation of spill control measures and training of all construction personnel and subcontractors in spill avoidance. Training will also include appropriate response if spills occur, in containment, clean-up, and reporting procedures consistent with applicable regulations and Refinery practices.

The following storage will be located on-site during and after construction, each with a spill containment structure:

- Lubrication oil stored on-site will be contained in barrels, which will be stored in a secondary containment area to contain any spillage, or they will be stored in temporary warehouses;
- Construction refueling will be closely supervised to avoid leaks or releases. Should a spill occur during refueling, it will be properly cleaned up by the general contractor and reported. If fuel tanks are used during construction, the fuel tank(s) will be located within a secondary containment with an oil-proof liner sized to contain the single largest tank volume plus an adequate freeboard allowance for rainwater.
- Transformer oil will be pumped from a truck within a temporary secondary containment area to contain any spillage.

Risk of Spills During Operation

Petroleum products used on site during operation will follow the same guidelines as for construction. Additional measures planned during operation include:

- Above-ground containers for steam-cycle chemicals (including oxygen scavenger, neutralizing amine, and phosphate) will be stored in tanks located indoors and will be contained in a curbed area sufficiently sized to contain the single largest storage tank volume.
- An above-ground acid tank will be located within a secondary containment area lined with an acid-proof coating and sized with sufficient freeboard for rainwater.
- An above-ground caustic tank will be located within a secondary containment area and sized with sufficient freeboard for rainwater.
- Above-ground step-up transformer mineral oil storage tanks will be located within secondary containment areas that will hold the transformer volume plus an adequate freeboard to accommodate rainwater.
- An oil-water sewer (OWS) system will collect selected equipment drains and rainfall and wash down runoff, which could carry away trace oil from within the curbed areas. Collected drainage and runoff will be pumped or drained to the existing Refinery treatment system.

5.1.2 Site Clearing and Construction

Construction of the proposed Cogeneration Project and access road will disturb 33-acres of which 10.18 acres have been identified as palustrine emergent wetlands. An additional 36-acres will be disturbed for the construction laydown areas, of which 22.89 acres have been identified as emergent herbaceous wetlands. The construction laydown areas will be maintained for future Refinery maintenance activities. A Clean Fuels Project under development at the refinery will take the space currently used for Refinery maintenance activities. Thus, the Refinery would develop this area for maintenance activity laydown activities anyway.

Impacts to wetlands caused by installation of the transmission line have been previously permitted (COE Permit # 1998-4-02349). An enhancement of 4.1 acres of emergent wetlands has already been implemented north of Grandview Road as mitigation for the impacts.

The proposed plant construction and access road will affect 22.99 acres (33.17 – 10.18 = 22.99) of upland vegetation. The construction laydown areas will affect 13.03-acres (36 – 22.97 = 13.03) of upland vegetation. As described previously in Section 3.3, Baseline Conditions, the upland vegetation is largely composed of non-native species, herbaceous species, and Himalayan blackberry thickets. The construction of proposed laydown areas will impact approximately 16 acres of upland vegetation.

5.1.3 Air Emissions

Air emissions from the Cogeneration Project will exit through three individual 150-foot tall, 18-foot diameter HRSG stacks and be transported downwind by the prevailing winds.

A variety of air quality studies were performed using approved air quality analyses methodologies and approved air quality dispersion models. These air quality studies evaluated the projected ground-level pollutant concentrations, the potential effect on the public health and welfare, the effect that the emissions would have on soils and vegetation, and odors. In addition, visibility was analyzed at the National Park Service and U.S. Forest Service designated sensitive areas.

These air quality studies were conducted without the benefit of the proposed emission reductions in the Refinery. Even without taking these reductions into account, the studies indicate that the operation of the proposed Cogeneration Project would comply with all federal and state standards for air quality, and would cause insignificant increases ambient concentrations of air pollutants. Ambient air concentrations during the facility's operation would be almost indistinguishable from existing air quality levels. Taking the Refinery’s emission reductions into account would result in the improvement in air quality for some criteria pollutants.

A more complete discussion of the projected emissions and air quality impacts can be found in Part II, section 3.2 and Part III, Appendix E of the Application for Site Certification.

5.1.4 Construction and Operation Noise

Noise associated with construction of the Cogeneration Project is not likely to impact listed species or critical habitat. Construction machinery will generate some noise, but this noise would be temporary and terminate upon the completion of construction. Moreover, noise levels will fluctuate during the construction stage depending upon the construction activities. Construction related noise is expected to be localized to the areas immediately adjacent to the Cogeneration Project.

Impacts from noise generated by the operating Cogeneration Project would not be significantly different than the character of the current background noise levels due to existing operations. Existing background noise is very low and similar to "white noise" produced by a distant cooling fan. Site-specific modeling studies indicate that operational noise will be minimal and below Washington State standards relative to industrial-zoning and residential-zoning criteria. This is especially true as noise levels significantly decrease with distance from the plant.

5.1.5 Wastewater

Wastewater treatment and discharge aspects in the design of the Cogeneration Project were described and discussed in Section 2.7.

Three sources of effects from wastewater on surface water are possible. First, the quantity or quality of surface water currently draining from or through the proposed site to Terrell Creek could be altered. However, the proposed Cogeneration Project has been designed to divert surface water around the plant in order to prevent alteration of quality or quantity. This surface water would continue to drain into wetlands north of Grandview Road, which, in turn, drains to Terrell Creek.

Second, stormwater from the Cogeneration project site will be routed to treatment facilities and detention ponds and routed to wetlands north of Grandview Road. This treated stormwater would co-mingle with other surface water drainages that eventually drain into Terrell Creek. Although the proposed Cogeneration Project will not directly affect Terrell Creek, a "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s)" (NMFS 1996: 13) is included as Table 6. Information for several of the parameters in this table was not collected during the stream survey discussed Section 3.3.2. However, the fact that Terrell Creek is currently used by resident coho salmon indicates that conditions in the stream are likely properly functioning. In addition, sufficient control methods and distance between the proposed project and the stream will result in no effect on the stream. In addition, effects will not occur because

no component of the proposed Cogeneration Project would be built near the stream and no storm or other surface water will be discharged directly to it.

The third source of effects could come from discharge of contaminated stormwater or other wastewater from the Cogeneration Project. As discussed in Section 2, stormwater or wastewater, which could carry trace oil or chemicals from secondary containment areas will be routed to the Refinery and treated in the Refinery's wastewater system treatment facility. Treated water would be discharged through the BP Refinery's NPDES permitted outfall. The Cogeneration wastewater component of the total Refinery's discharge into the Georgia Straits will be less than 2%. Because the volume of Cogeneration wastewater is very small and contains very low levels of contaminants, it would have little effect on the quality of water discharged, and in fact, would slightly improve the quality of water discharged. It will, therefore, have no effect on threatened and endangered species.

5.2 Listed and Candidate Species

5.2.1 Direct Impacts

Direct impacts to listed and candidate species are not be anticipated from this project. The primary reason for this is the lack of use of the Cogeneration Project site by listed and candidate species and the design features of the project. All sources of direct effects on listed and candidate species and critical habitats would be avoided through design features of the proposed Cogeneration Project as discussed in the previous section and in the Project Description.

5.2.2 Indirect Effects

Indirect effects could include potential impacts from changes in the quantity or quality of surface water draining to Terrell Creek. In addition, changes in the Refinery's industrial NPDES wastewater discharge could affect marine water quality and habitats. However, as shown in previous sections, the design of both the Cogeneration Project, the methods to control and manage the stormwater and the Refinery's wastewater treatment facility will avoid these effects.

5.2.3 Cumulative Effects

Within the project action area, the Refinery is adjacent to the proposed Cogeneration Project site. In addition, Alcoa Intalco Works (an aluminum smelter), the Phillips Ferndale Refinery, and a number of other industrial facilities are within a few miles (Section 3.2, Existing Developments). The proposed Cogeneration Project would add additional impervious surfaces to the action area and wastewater.

Although the Cogeneration Project will result in the filling of some low-value wetlands, BP is preparing a wetland mitigation plan that will result in an overall improvement in wetland function and wildlife habitat for the area. The mitigation wetlands would

provide contiguous enhanced habitat with existing wildlife and wetland enhancement areas adjacent to Terrell Creek significantly improving the biodiversity of the Terrell Creek ecosystem.

5.2.4 Interdependent/Interrelated Effects

Interdependent/interrelated effects could result from the construction of a new transmission line to connect the proposed Cogeneration plant to the 230-kV BPA transmission line adjacent to BP property as described in Section 2.2. This transmission line access roads and tower pads were permitted and constructed as a separate project by the Corps as a "Nationwide Permit 26", dated December 20, 1999. The transmission line would be 0.8 mile long when constructed. Construction of the access roads and tower pads filled a very small wetland area and required a small amount of tree removal. Wetland mitigation for the access roads and tower pads was the construction of a 4.8-acre wetland complex north of Grandview Road. Additional details of the interrelated project are available from the Washington Department of Ecology, Order number 1998-4-02349.

The proposed Cogeneration Project by itself does not enable or encourage growth in the area, because it does not provide the infrastructure needed for growth. An immediate positive effect would be the reduction in fuel use and an improvement in efficiency at the Refinery for generation of power and steam as discussed in Section 2.2.

6. MANAGEMENT ACTIONS RELATED TO THE SPECIES

Effects from the proposed Cogeneration Project would be avoided and minimized through design of the facility. No critical habitat for any listed or candidate species will be directly or indirectly impacted. Thus, specific impact reduction measures or other additional management actions related to listed and candidate species are not necessary.

7. RECOMMENDED DETERMINATIONS

As shown in previous discussions of effects, the proposed Cogeneration Project will avoid or minimize all effects to listed and candidate species and critical habitat. Thus, the following effect determinations are *recommended*.

7.1 Chinook Salmon: Threatened

A *recommended* determination of **no effect** is made for chinook salmon. Effects on surface water quality and quantity and on marine water quality will be avoided through design features. The water quality and quantity of Terrell Creek will not be changed by any action of the proposed project. In addition, chinook salmon do not appear to use Terrell Creek.

Discharges to the marine environment will be controlled by the BP Cherry Point Refinery wastewater treatment system, which is regulated and monitored under the Refinery's NPDES permit. Thus, any effects to the marine habitats will also be avoided.

7.2 Coho Salmon: Candidate

A *recommended* determination of **no jeopardy** is made for coho salmon. If listed, the *recommended* determination would be **no effect** for the same reasons as discussed for chinook salmon, even though coho salmon use Terrell Creek.

7.3 Bull Trout: Threatened

A *recommended* determination of **no effect** is made for bull trout for the same reasons as for chinook and coho salmon. There are no known populations of bull trout that use the project action areas and effects on marine water quality will be avoided through project design features.

7.4 Steller Sea Lion: Threatened

A *recommended* determination of **no effect** is made for Steller sea lions. The proposed Cogeneration Project will not affect feeding, resting, or breeding habitat or resources for Steller sea lions since they have not been shown to occur in the project vicinity or action areas.

7.5 Humpback Whale: Endangered

A *recommended* determination of **no effect** is made for humpback whales. The proposed Cogeneration Project will not affect feeding, resting, or breeding habitat or resources for humpback whales since they have not been shown to occur in the project vicinity or action areas.

7.6 Leatherback Sea Turtle: Endangered

A *recommended* determination of **no effect** is made for leatherback sea turtles. The proposed Cogeneration Project will not affect feeding, resting, or breeding habitat or resources for leatherback sea turtle since they have not been shown to occur in the project vicinity or action areas.

7.7 Marbled Murrelet: Threatened

A *recommended* determination of **no effect** is made for marbled murrelets. There is no critical habitat for breeding near the project action areas and use of the marine waters in the indirect effects action area has been shown to be low. Thus, construction or operation will not affect feeding, resting, or breeding habitat or resources for marbled murrelets. Because of the lack of critical habitat and the substantial distance to the nearest nesting habitat, temporary effects of noise and additional human presence are insignificant.

7.8 Bald Eagle: Threatened

A *recommended* determination of **no effect** is made for bald eagles. The proposed construction and operation will not affect feeding, resting, or breeding habitat or resources for bald eagles. Because of the substantial distance to the nearest nesting location, temporary effects of noise and additional human presence are insignificant. In addition, eagles apparently do not use the project site or direct effects action area for foraging or roosting.

8. ESSENTIAL FISH HABITAT ANALYSIS

The indirect effects action area for the proposed Cogeneration Project includes Terrell Creek and marine waters and habitats within the NPDES chronic dilution zone at the BP Refinery pier near Cherry Point. Both of these water bodies are Essential Fish Habitat (EFH). Terrell Creek is EFH for coho salmon. The following fish species and groups use the marine portion of the indirect effects action area:

- Groundfish including several species of flatfish (see Section 3.3.3);
- Lingcod (*Ophiodon elongates*);
- Cabezon (*Scorpaenichthys marmoratus*);
- Brown rockfish (*Sebastes auriculatus*);
- Coastal pelagics including Pacific herring, Pacific sandlance, and surfsmelt; and
- Chinook, coho, and pink salmon.

As shown previously by the ESA analysis, the proposed Cogeneration Project would not result in any measurable effects to water or habitat quality. No permanent adverse effects to EFH for groundfish, coastal pelagics, Pacific salmon, or their prey species would occur from the proposed Cogeneration plant construction or operation. Therefore, the project will have **no effect** on EFH for groundfish, coastal pelagics, or Pacific salmon.

9. REFERENCES

Berger / ABAM Engineers Inc. 2000. *ARCO Products Company Cherry Point Refinery Marine Terminal Pier Addition, Endangered Species Act Biological Evaluation*. Prepared for the ARCO Cherry Point Refinery, Blaine, Washington.

Cooke, L.R., T. McKenzie, and S. Visconty. 2000. *Biological Assessment for Threatened and Endangered Species Listed by the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. Taylor Avenue Dock Waterfront and Beach Access Project*. City of Bellingham Parks and Recreation Department.

ENSR Consulting and Engineering. 1995. *Assessment of Marbled Murrelets and Other Marine Bird Use near the ARCO Marine Terminal*. Report prepared for ARCO Products Company Cherry Point Refinery.

Everitt, R.D., C.H. Fiscus, R.L. DeLong. 1980. *Northern Puget Sound Marine Mammals*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Environmental Protection Agency. Report No. EPA 600 / 7-80-139.

Gardner, Fred (editor). 1981. *Washington Coastal Areas of Major Biological Significance*. Washington Department of Ecology Baseline Studies Program.

Golder Associates Inc. July 2001. *Noise Impact Analysis for the BP Cherry Point Cogeneration Plant, Whatcom County, Washington*. Prepared for the BP Cherry Point Refinery.

Golder Associates Inc. September 2001. *Wetland Functions and Values Assessment Technical Memorandum*. Prepared for BP Cherry Point Cogeneration Project.

Golder Associates Inc. October 2001. *Stormwater Management System Design Basis: Regulations*. Memorandum prepared for the BP Cherry Point Refinery Cogeneration Project.

Gossett, E.J. 2001. *Working Document – for Preparation of a Biological Evaluation (BE) or Biological Assessment (BA)*. Version: February 5, 2001. E-mailed to Michael Kyte, Golder Associates Inc.

Huddle, D. 2002. Scientific Technician assigned to Stock Assessment, Washington Department of Fish and Wildlife, LaConner. Personal communication to Michael Kyte, Golder Associates Inc., January 14, 2002.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. *Status review of Chinook Salmon from Washington, Idaho, Oregon, and California*. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35, 443 p.

Phillips, R. 1984. *The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile*. U.S. Fish and Wildlife Service report FWS / OBS – 84 / 24.

Thom, R.M., C.A. Simenstad, J.R. Cordell, and E.O. Salo. 1989. *Fish and Their Epibenthic Prey in a Marina and Adjacent Mudflats and Eelgrass Meadow in a Small Estuarine Bay*. University of Washington Fisheries Research Institute Report FRI-UW-8901.

URS Corporation. 2001. *Wetland Mitigation Potential survey report, BP Cherry Point Property*. Draft Report prepared for the BP Cherry Point Refinery.

U.S. Fish and Wildlife Service. 1997. *Recovery Plan for the Threatened Marbled Murrelet (Brachyramphus marmoratus) in Washington, Oregon, and California.* Portland, Oregon. 203 pp.

Warinner, R. 2002. Regional freshwater fisheries habitat biologist, Washington Department of Fish and Wildlife, LaConner. Personal communication to Michael Kyte, Golder Associates Inc., January 4, 2002.

Washington State Department of Ecology. 1999a. *National Pollutant Discharge Elimination System Waste Discharge Permit*. ARCO Products Company Cherry Point Refinery.

Washington State Department of Ecology. 1999b. *Methods for assessing wetland functions Volume 1: Riverine and Depressional Wetlands in the Lowlands of Western Washington*.

Washington State Department of Fish and Wildlife. 2000. *Priority Habitat and Species Report: Priority Habitats and Species*. 17 March 2000.

Watson, J.W., and D.J. Pierce. 1998. *Ecology of Bald Eagles in Western Washington with an Emphasis on the Effects of Human Activity*. Final Report. Washington State Department of Fish and Wildlife, Olympia, Washington.

Weitkamp, L., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. *Status Review of Coho Salmon from Washington, Oregon, and California*. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-24.

Whatcom County. 2001. Whatcom County Code [on-line]. Available at: http://www.co.whatcom.wa.us/Council/code/code.htm

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. *A Catalog of Washington Streams and Salmon Utilization. Volume 1. Puget Sound Region*. Washington State Department of Fish and Wildlife.

TABLES

TABLE 4

Peak Discharge (cfs) from Cogeneration Drainage Areas

Site Name	6-month 24-hour	2-yr 24-hour	10-yr 24-hour	25-yr 24-hour	100-yr 24-hour
Drainage Area 1	4.24	8.43	17.65	22.43	32.35
Drainage Area 2	3.11	5.66	10.06	12.32	16.94
Drainage Area 3	0.67	1.42	2.79	3.51	5.01
Drainage Area 4	4.60	9.11	11.22	13.30	17.47
Drainage Area 5	1.86	2.87	4.52	5.36	7.03
Drainage Area 6	2.65	5.04	9.29	11.50	15.99

TABLE 5

Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators

Watershed Name: Terrell Creek Location: WRIA 1

Pathways	**Environmental Baseline**			**Effect of the Action(s)**		
Indicators	**Properly Functioning**	**At Risk**	**Not Properly Functioning**	**Restore**	**Maintain**	**Degrade**
Water Quality						
Temperature	X				X	
Sediment	X				X	
Chemical Contaminants / Nutrients	unknown				X	
Habitat Access						
Physical Barriers	X				X	
Habitat Elements						
Substrates	X				X	
Large Woody Debris	X				X	
Pool Frequency	X				X	
Pool Quality	X				X	
Off-Channel Habitat	X				X	
Refugia	X				X	
Channel Condition & Dynamics						
Width / Depth Ratio	X				X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology						
Peak / Base Flows	X				X	
Drainage Network Increase	unknown				X	
Watershed Conditions						
Road Density and Location		X			X	
Disturbance History			X		X	
Riparian Reserves			X		X	

FIGURES